

is only what it professed to be—"Illustrations of the Land and Freshwater Shells of British India." The letterpress gives a dry list of species and synonyms, not arranged in classified order, with occasional notes. This is admitted by the editors, who state that they "do not acknowledge the validity of many of these species, but merely illustrate them." They also state their "regret that the figures of some of the more minute shells are not so well executed as they expected; but lithography is scarcely compatible with sharp definition." We fully concur in the last remark. Although this is not a review of their work, we cannot help noticing the fact that certain species of freshwater shells belonging to the northern portion of British India, and which are enumerated in the "Conchologia India," are also natives of Europe. Such are *Limnæa auricularia* and *stagnalis* of Linné, *L. peregra* and *truncatula* of Müller, and *Valvata piscinalis* of Müller; but there is no species of *Unio*, *Anodonta*, *Sphærium*, or *Pisidium* common to the two regions. The occurrence of the first-named five species in countries so geographically and widely separated, may be partly explained by these species having spread from Siberia, which they likewise inhabit; but the mode of their original distribution from Europe to Siberia, or *vice versa*, still remains a problem. If water-fowl or other animals had been instrumental in such distribution, why should not any of the freshwater bivalves, which are likewise European and Siberian, have been similarly transported to British India?

The present work is intended to be published in parts, of which the first has now appeared. It contains seventeen octavo pages of letterpress and four quarto plates. The descriptions of new species, as regards both the shell and soft parts or animal, have been most carefully written, and the author has properly given the distinctive characters of each species in a correlative order, which is a point of material assistance in comparing one species with another. There are, nevertheless, a few exceptions to this useful rule in species of *Kaliella* and *Microcystina* (pages 5, 12, and 13), where the umbilicus is described first, and before the shape of the shell. The shells are admirably drawn, although the colouring is unsatisfactory. Without having critically studied the specimens figured, and especially "a hatful" of them, one might, on looking at the illustrations, be inclined to question the specific distinction of several. But all naturalists are never likely to agree in that matter; and perhaps it may be immaterial whether certain forms are called species or varieties. The minds of some naturalists have a synthetic and of others an analytic tendency.

Col. Godwin-Austen seems to attach considerable importance to the odontophore or lingual ribband as an element of classification. We believe that this affords a good auxiliary character in defining genera or higher groups of the Solenoconchia and Gastropoda; but the recent investigation of the subject by Herr Friele in respect of northern species of *Buccinum* shows that the odontophore varies so greatly in individuals of the same species that it cannot be fully relied on for distinguishing species. Some Gastropods, e.g. *Odostomia* and *Eulima*, have no odontophore, in consequence of their food consisting of soft polyparies.

The work now noticed is a very valuable contribution to the natural history of India, and has been intrusted to a naturalist who is by no means less competent because he is actuated by modest aspirations.

J. GWYN JEFFREYS

Mémoires de la Société des Sciences Physiques et Naturelles de Bordeaux. 2^e série, tome iv. 3^e cahier. (Bordeaux, 1881.)

THIS cahier contains nine papers, all mathematical. We recently called attention (vol. xxv. p. 408) to an article in

the second cahier, by M. Paul Tannery, on the Arithmetic of the Greeks. The same writer now furnishes two contributions—one, "Sur la mesure du cercle d'Archimède," in which he discusses how far Archimedes (in his *κύκλου μέτρησις*) was acquainted with methods which form the base of the solution of what is now called the Pellian problem; the second is entitled "De la Solution Géométrique des problèmes du second degré avant Euclide," and in it he discusses questions very nearly allied to those considered by Dr. Allman in his "Greek Geometry from Thales to Euclid."

M. Ordinaire de Lacalouge also contributes two papers—one on the tramways of Bordeaux ("en regardant poser les rails et marcher les premières voitures des tramways on a tout naturellement l'idée de rechercher le rayon minimum des courbes où ces véhicules peuvent circuler. Ils ont, sous certains rapports, de l'analogie avec les wagons de chemin de fer, mais en différent, surtout par leur vitesse de translation"); the second discusses the "théorie géométrique du pendule de Foucault" as against M. Yvon de Villarceau; it is modestly written, and is valuable from its furnishing many interesting historical references. Regarding the views broached in the article, the author concludes with "le temps dira si c'est une illusion."

M. Kowalski, in a "Note sur les systèmes coordonnés d'unités électriques spécialement sur celui de l'Association Britannique et ses applications," does good work in giving a concise elementary account of these systems of units, "notions que les traités classiques de physique publiées jusqu'ici en France passent à peu près complètement sous silence."

The remaining four papers are by M. Saltel, viz. "Réflexions sur la mesure du volume de la sphère" (with a demonstration); "Étude de la variation du cercle osculateur en un point M d'une section plane d'une surface"; "Théorèmes généraux sur la décomposition des enveloppes, théorème sur les surfaces développables"; "Contribution à la théorie du changement des variables dans le calcul des intégrales simples et multiples."

On and Off Duty: being Leaves from an Officer's Note-Book. By S. P. Oliver. (London: W. H. Allen and Co., 1881.)

THE chief contents of this handsome volume are derived from the rough notes and sketches made by Capt. Oliver, some years ago, when a young subaltern of artillery. They show that, whether in Turania, Lemuria, or Columbia, he took notes of all the strange things he saw, and although many of his observations have appeared from time to time in the journals or proceedings of various societies, or as articles in periodicals, they were, we think, interesting enough to be collected into a more permanent form, which we trust may stimulate others of Her Majesty's officers to follow Capt. Oliver's example.

The first part of the volume is devoted to an account of the author's visit to China and Japan. There is a graphic description of the visit to Tsing-Yuen, to see that the treaty (1860) of peace was properly posted up as required. Snakes are mentioned as abounding; and we learn that snake's flesh is eaten from choice not rarely by the Chinese: indeed, boiled-snake soup is a favourite febrifuge for invalids. The author says that at Shao-K'ing numerous bodies of the rebels were floating past with the stream, and that though the majority were decapitated, all the bodies of the men floated on their backs, whereas all the bodies of the women floated "face downwards." The notes on Japan are of interest, as intercourse with foreigners is so improving the Japanese, that such peculiar games as Jon-noki are not now-a-days to be commonly seen played; and the author was fortunate to see Yeddo ere it ceased to be the exclusive city.

The second part is taken up with a visit to Lemuria, thereby meaning Madagascar and the Mascarene Islands of Bourbon and Mauritius. This visit was made in 1862. The Seychelles were not visited. Some noteworthy details are given of a visit to Madagascar. The home of the *Oswirandra fenestralis* is well described, and the account of a Mauritius hurricane is true to the life. It is mentioned that in the hurricane of March 12, 1868, the iron girders, 200 feet in length, and weighing over 300 tons, were blown from the railway bridge over Grande Rivière, when a force of 100 pounds to the square foot must have been exerted by the wind down the ravine.

In an appendix to the second part, there is a chapter on the natural history of Madagascar, contributed by Mr. J. G. Baker, F.R.S., of Kew.

The third part of the volume describes a visit to Columbia along with Capt. Pim and Mr. John Collinson, for the promotion of a transit railway route through Mosquitia and Nicaragua.

The volume will commend itself to the general reader, and the scientific notices mentioned therein will be found very generally interesting and correct.

Modern Metrology. By Lewis D'A. Jackson. (London: Crosby Lockwood, 1882.)

IT is no easy task to give an account of the various systems of weights and measures in use throughout the world, to trace their origin, and to express their equivalents in English and French weight and measure, but this the author has undertaken in one part of his book, and has brought together much valuable and interesting information. This work is so far a cambist or dictionary of weights and measures, both the scientific and commercial equivalents of all foreign units being given. It would have been well, perhaps, if the author had stated for each country the precise authority from which he obtained his equivalent, as works of this kind should as far as possible contain within themselves means for verifying the accuracy of the figures given.

The main object of the work appears, however, to be the discussion of a remedy for the evils of the complex systems of weights and measures which are unfortunately still in use in this country. To provide such a remedy is a serious task, and one well worthy of the attention of a great statesman such as Mr. Gladstone, to whom this work is inscribed.

The author discusses the vexed question of the relative values of standard temperatures at 32° and at 62°, and proposes a new English system based on a cubic foot of 1000 "fluid ounces," at the temperature of the maximum density of distilled water.

The "fluid ounce" is taken as equal to the weight of distilled water contained in a cubical vessel whose dimensions are equal to a "tithé," or tenth part of the linear foot, when weighed and measured also at the temperature of the maximum density of distilled water. The various parts and multiples of the cubic-foot and "foot-weight" would be built up by decimal progression, so that a strict correspondence would be always maintained between capacity, linear dimension, and weight. The effect of reducing the temperature of the cubic foot from 62° F. (the present legal temperature) to 39° 1 F. (the temperature of the maximum density of water), would bring the weight of the cubic foot more into accordance with modern research, as it would raise its weight from 62.321 lb. to 62.424 lb.

Although we have faint hope of present success in disturbing the deeply-rooted systems of measures now in use by this great commercial nation, or of substituting for the purposes of international science a more acceptable metrology than that based on the metre and gramme, we cannot but recommend this work to the consideration of all interested in the practical reform of our weights and measures.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Sun-Spots and Magnetic Storms

SOME particulars of the remarkable double outburst of sun-spots in the latter part of April and of the magnetic disturbances which appear to have been connected with them, as recorded at Greenwich, may be of interest to your readers. It is in itself a noteworthy fact that there should be on the sun at the same time two spots, one of them double, sufficiently large to be visible to the naked eye, and this is made still more interesting by the occurrence of a violent magnetic storm a few days after the appearance of each of these large spots.

The larger of the two spots would seem to have first made its appearance at the east limb on April 11 at about 15h. G.M.T., though no photograph of it was obtained till April 14. It must have passed off the disk about April 25 8h., being well shown on a photograph on April 24. It extended over 10° of heliographic longitude, and measured more than 2' of arc in length and breadth.

The group preceding it, consisting of two spots, was first photographed near the east limb on April 11, and was then comparatively small. Between April 16 and 17 it increased suddenly in size, becoming nearly as large as the other spot group, and far exceeding in area any of the spots previously recorded at Greenwich.

The areas of these groups on the photographs, expressed in millionths of the sun's visible hemisphere, and corrected for foreshortening were as follows:—

1882.	Great Spot		Preceding Group.	
	Nucleus.	Whole Spot.	Nucleus.	Whole Spot.
April 11			17	141
14	351	2218	40	270
16	239	2086	24	156
17	391	1979	204	880
18	465	2030	244	1370
20	340	1916	294	1813
21	427	2105	440	2360
23	267	1786	167	1054
24	316	1727		

The total spotted area on 1882, April 17, was 881 for the nuclei, and 4668 for the whole spots, being about double of the greatest spotted area shown on any of the Greenwich photographs previous to this outburst.

On April 16 and 19 violent magnetic disturbances occurred. At Greenwich the declination, horizontal force, and vertical force magnets became violently disturbed on April 16 at 11h. 30m. G.M.T., the first movement for all three being simultaneous and sudden, and the storm movements continued till April 17, 7h. 30m. G.M.T. The magnets remained quiet till April 19, shortly after 15h. 30m. G.M.T., when another sudden and very sharp disturbance commenced, lasting till April 20, 20h. G.M.T.

In the magnetic storm of April 16-17, there were large oscillations of declination till April 17 0h., the greatest recorded motion being about 1°, from a diminished declination at 19h. 4 to an increased declination at 19h. 30. Then until 4h. the register cannot be traced, the motions being either unusually rapid, or the magnet being disturbed by workmen in the upper room. About 7h. there were some sharp motions, after which time the magnet became quiet. The principal feature of the disturbance of horizontal force was at first an increase, followed by a much larger diminution, amounting to about 1.50th of the whole force at 16h., when the trace went off the sheet, and was lost until April 17 0h. There was then a great and rapid increase (in about 40m.) of about 1.40th part. Rapid motions were then shown till 7h. 30m. The whole range of these disturbances probably exceeded 1.25th part of the whole force. The vertical force at first decreased somewhat till April 16, 16h., and afterwards very considerably till about 18h., when it was diminished by about 1.100th part, then with the horizontal force it increased till about 1h., when the trace went off the sheet, its value being then